

*SETARIA VILLOSISSIMA* (GRAMINEAE) IN ARIZONA: FACT OR FICTION

John R. Reeder

Herbarium, University of Arizona, Tucson, Arizona 85721 U.S.A.

ABSTRACT

Two specimens of *Setaria*, (*Emersley 19* and *21*) which lack label data except for Arizona and the date 1890, have been considered to represent *S. villosissima* (Scribn. & Merr.) K. Schum. since Hitchcock suggested that assignment in 1920. The decision was based primarily on the size of the spikelets which measure to 3 mm, even though both specimens lack any pubescence on the blades, a prime characteristic of *S. villosissima*. Reexamination of the specimens, along with study of collections of *S. leucopila* (Scribn. & Merr.) K. Schum. at ARIZ reveal that spikelets in the latter species, although usually listed as no more than 2.7 mm in length, frequently measure as much as 3 mm, and rarely more. It is concluded that *Emersley 19* and *21* actually represent *S. leucopila*, and that *S. villosissima* does not occur in Arizona. It is suggested that the rather robust Emersley specimens were garden-grown, since on the label of one of the sheets one finds "grew finely in garden."

KEY WORDS: Gramineae, *Setaria*, Emersley, Arizona, U.S.A.

Hitchcock (1920), in a note under *Chaetochloa villosissima* Scribn. & Merr., states "Two specimens from Arizona (no definite locality), *Emersley 19* and *21* in 1890, may also belong to this species. The blades are scabrous but not villous, and only 3 to 5 mm. wide. The first glume is almost half as long as the spikelet and pubescent near the margins." Although some doubt was expressed in 1920, 11 years later the same author (Hitchcock 1931) includes Arizona as part of the range of this species [now as *Setaria villosissima* (Scribn. & Merr.) K. Schum.]. In the *Manual* (Hitchcock 1935) the range is given as "Texas and Arizona (locality unknown)." This statement is repeated in the revised edition (Hitchcock 1951). Swallen also (1942, 1951, 1960) lists the species from Arizona, citing the same two Emersley specimens, as does Gould

(1951). Arizona is included as part of the range of this species by Emery (1957), Rominger (1962), Correll & Johnston (1970), and Gould (1975). Both Emery and Rominger cite the same two Emersley specimens.

Except for Hitchcock (1920), none of the above authors has commented specifically about the two Emersley specimens, which still serve as the only basis for including Arizona within the range of this species. Hitchcock's statement is quoted above. Gould (1951) suggested that *Setaria villosissima* might be "little more than a robust, villous-bladed form of *S. macrostachya*", and adds that "Arizona plants of *S. macrostachya* frequently have spikelets to 3 mm. long and at least puberulent leaf blades." This quote suggests that Gould was under the impression that the Emersley specimens have villous leaves, which is not the case. He indicates that he had seen no plants referable to *S. villosissima*, but based his opinion solely on published descriptions; he had no specific comment regarding the Emersley specimens. It should be noted that in 1951 Gould did not distinguish *S. leucopila* from *S. macrostachya* H.B.K. In his *Grasses of Texas* (1975), Gould recognized these two species as distinct, indicating that the spikelets of the former species are 2.1-2.7 mm, and in the latter "seldom over 2 mm. long."

Perusal of the literature leaves one with a distinct impression that the sole reason for referring the Emersley specimens to *Setaria villosissima* is that the spikelets are 3 mm long. The only other species which might accommodate them seems to be *S. macrostachya* or *S. leucopila*, but this placement has been rejected since all recent treatments of *Setaria* indicate that the maximum spikelet length for the latter two species is 2.5(-2.7) mm. In fact, most keys to *Setaria* species separate *S. villosissima* from others in the complex by means of 3 mm long spikelets and villous leaves. As stated above, however, Hitchcock (1920) pointed out that the blades of the Emersley specimens from Arizona are scabrous, rather than villous.

Through the courtesy of my colleague at ASC, J.M. Rominger, who had the specimens on loan from US, I have recently had an opportunity to study Emersley 19 & 21. Both sheets were annotated as *Setaria villosissima* by Rominger in 1968. As has been pointed out, there are no locality data except for Arizona, and the date 1890. Both specimens are fragmentary, in that the base is missing. Number 19 appears to represent a single plant which has branched and produced three flowering culms, the longest ca. 10 dm in length. Two of the inflorescences, which seem immature, are compact and show no spreading branches. The third and most mature is 15 cm long and 2 cm wide at the base. The lower two branches, 2.0 and 2.5 cm long, spread slightly from the axis. The culms, sheaths, and blades are glabrous or scabrous. Number 21 consists of a flowering culm 75 cm in length. The inflorescence is 16 cm long and more or less compact, although the lower branches are somewhat distant. The longest (lowest) branch measures about 2 cm. The sheet also includes a fragment of a stem with three attached leaves. As is the case with no. 19, the

material on this sheet is glabrous or scabrous only. Neither of the Emersley specimens has villous blades.

It is more or less standard practice to key out *Setaria villosissima* on the basis of spikelets 3 mm or more long and villous blades. Nevertheless, even when Arizona is given as part of the range, there has been no mention since 1920 of the fact that *Emersley 19 & 21* (the sole basis for the Arizona record) have blades that are scabrous, and not at all villous.

There seems to be general agreement that the Emersley specimens are part of what one might call the "*Setaria macrostachya*" complex, and related to *Setaria leucopila*. Available keys separate them from the latter species on the basis of spikelet length. Most authors give the spikelet length of *S. leucopila* as 2.2 to 2.5 or 2.1 to 2.7, but never as much as 3 mm. To my knowledge, the only agrostologist who has even suggested that the Emersley specimens might represent *S. leucopila* is Rominger who (pers. comm.) noted "appears to be robust *S. leucopila* (spikelets 3 mm!!)" As a matter of fact, a specimen at ARIZ (*Rea 1486*) which is very similar to the two Emersley samples even to having spikelets 3 mm long, was annotated by Rominger as *S. leucopila* in 1992.

To test the accuracy of spikelet length in *Setaria leucopila*, as given by agrostologists in general, I examined herbarium specimens of that species at ARIZ. I was particularly interested in determining whether the spikelets attained a length of 3 mm, and if so was it a common or rare occurrence. Among our holdings, 17 specimens were discovered in which the larger spikelets reached a length of 3 mm or more. These were from six different counties, from Santa Cruz in the south to Coconino in the north.

Based on the above information, I conclude that *Emersley 19 & 21* (the sole basis for the Arizona record of *Setaria villosissima*) in reality represent *Setaria leucopila* (Scribner & Merrill) K. Schumann. The sheets have been so annotated.

Rominger (pers. comm.) reports that recent examination of specimens of *Setaria leucopila* at ASC further document the occurrence of spikelets measuring 3 mm in length. He adds that he agrees that *S. villosissima* does not occur in Arizona, and that the Emersley collections are best included in *S. leucopila*. There is no solid evidence that *Setaria villosissima* occurs in Arizona.

NOTE: It has been pointed out by several authors that the Emersley specimens discussed here have no locality data other than "Arizona." It is of interest that on the label of no. 19 one can read: "Native, Perennial, branching, wild. Is valuable, grew finely in garden." Possibly this, and also no. 21, actually represent garden-grown plants, although the seed may well have been gathered in Arizona.

## ACKNOWLEDGMENTS

I am grateful to James Rominger who, permitted me to examine the Emery specimens while he had them on loan from US, and to him and Philip Jenkins for reviewing the manuscript.

## LITERATURE CITED

- Correll, D.S. & M.C. Johnston 1970. *Manual of the Vascular Plants of Texas*. Texas Research Foundation, Renner, Texas. 1881 pp.
- Emery, W.H.P. 1957. A cyto-taxonomic study of *Setaria macrostachya* (Gramineae) and its relatives in the southwestern United States and Mexico. *Bull. Torrey Bot. Club* 84:94-105.
- Gould, F.W. 1951. Grasses of southwestern United States. *Univ. Arizona Biol. Sci. Bull.* 7:1-343.
- . 1975. *The Grasses of Texas*. Texas A&M Univ. Press, College Station, Texas. 653 pp.
- Hitchcock, A.S. 1920. The North American species of *Chaetochloa*. *Contr. U.S. Natl. Herb.* 22:155-208.
- . 1931. *Setaria* in North American Flora 17(4):316-331.
- . 1935. *Manual of the Grasses of the United States*. USDA Misc. Publ. 200. 2 Ed. (Revised by Agnes Chase, 1951.)
- Rominger, J.M. 1962. Taxonomy of *Setaria* (Gramineae) in North America. *Illinois Biol. Monogr.* 29. 132 pp.
- Swallen, J.R. 1942. Gramineae. *In: Kearney, T.H. & R.H. Peebles, Flowering Plants and Ferns of Arizona*. USDA Misc. Publ. 423.
- . 1951. Gramineae. *In: Kearney, T.H. & R.H. Peebles, Arizona Flora*. Univ. California Press, Berkeley, California. 1032 pp. 2 Ed., with supplement by J. T. Howell, E. McClintock, *et. al.* 1960. 1086 pp.